

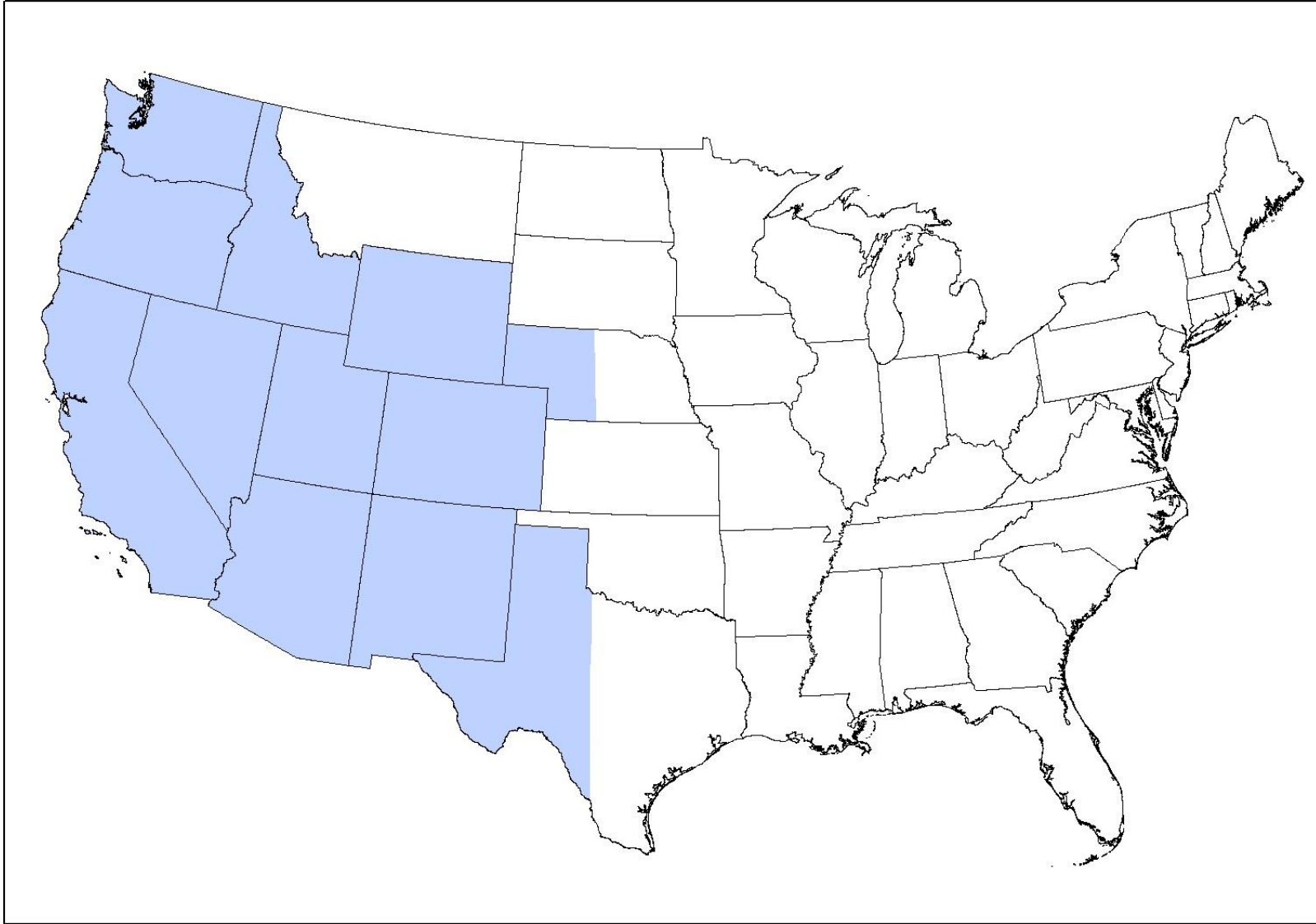
The Safe Transport of Radioactive Materials

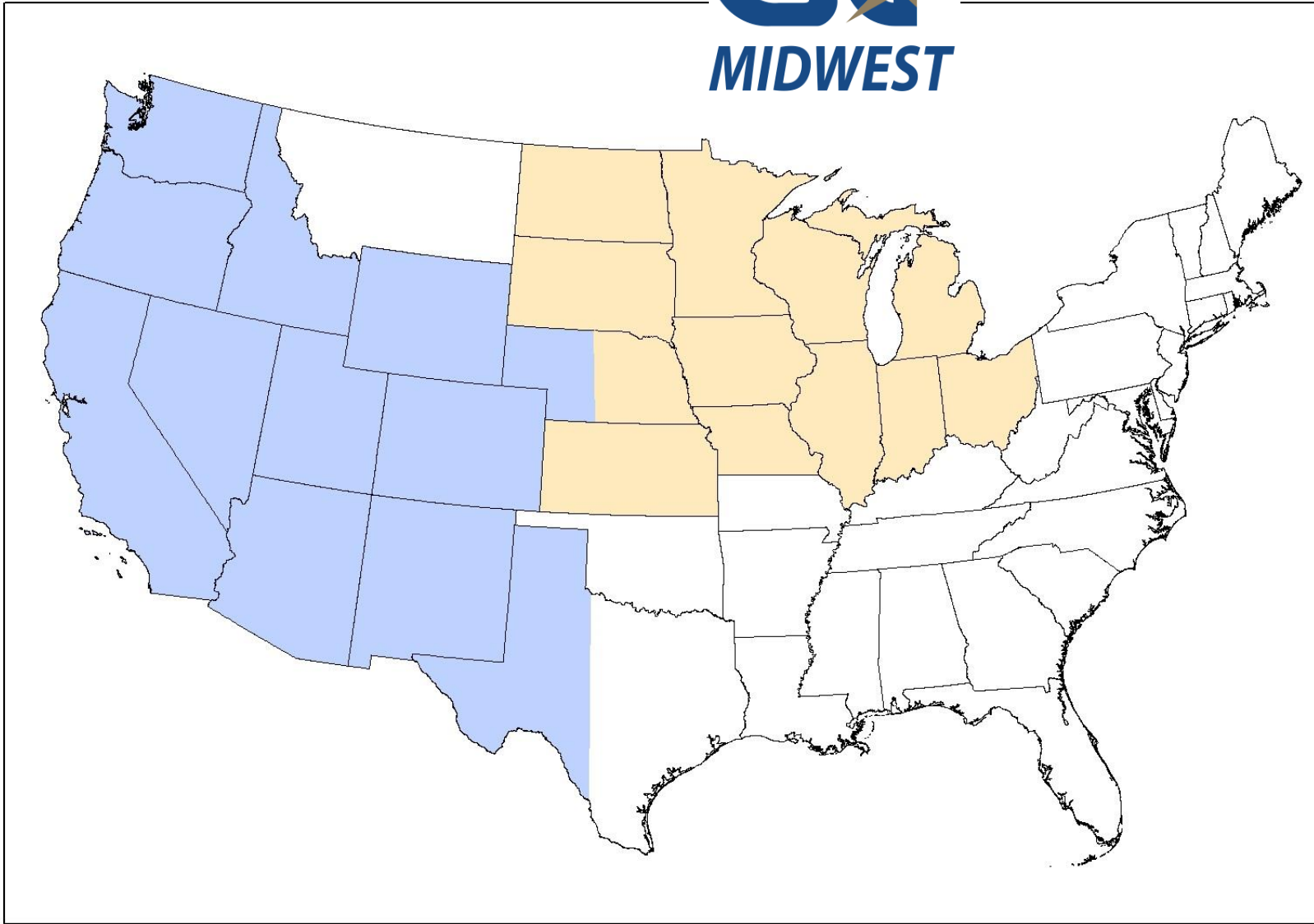
Ken Niles, Assistant
Director, Oregon
Department of Energy

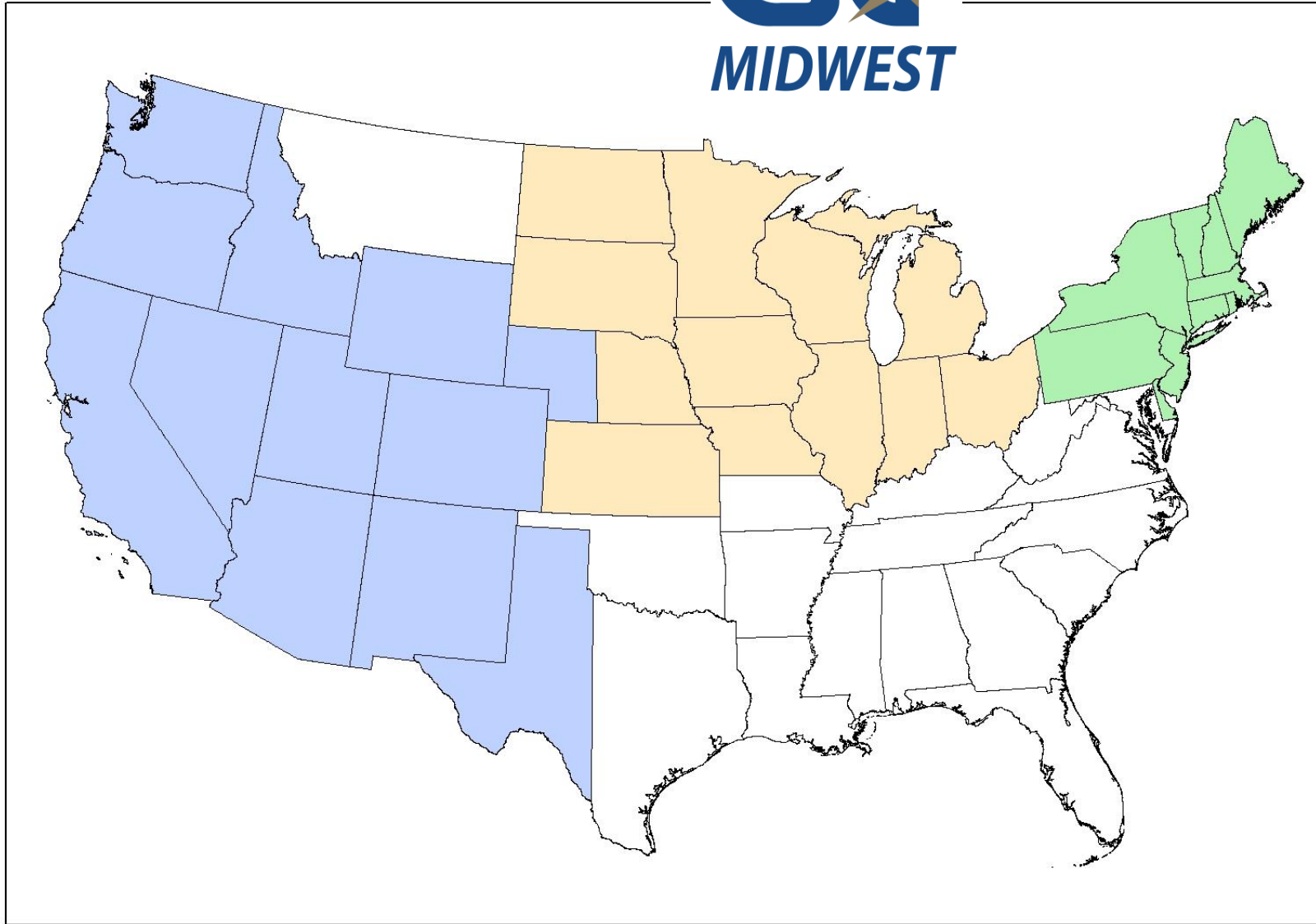
February 5, 2020

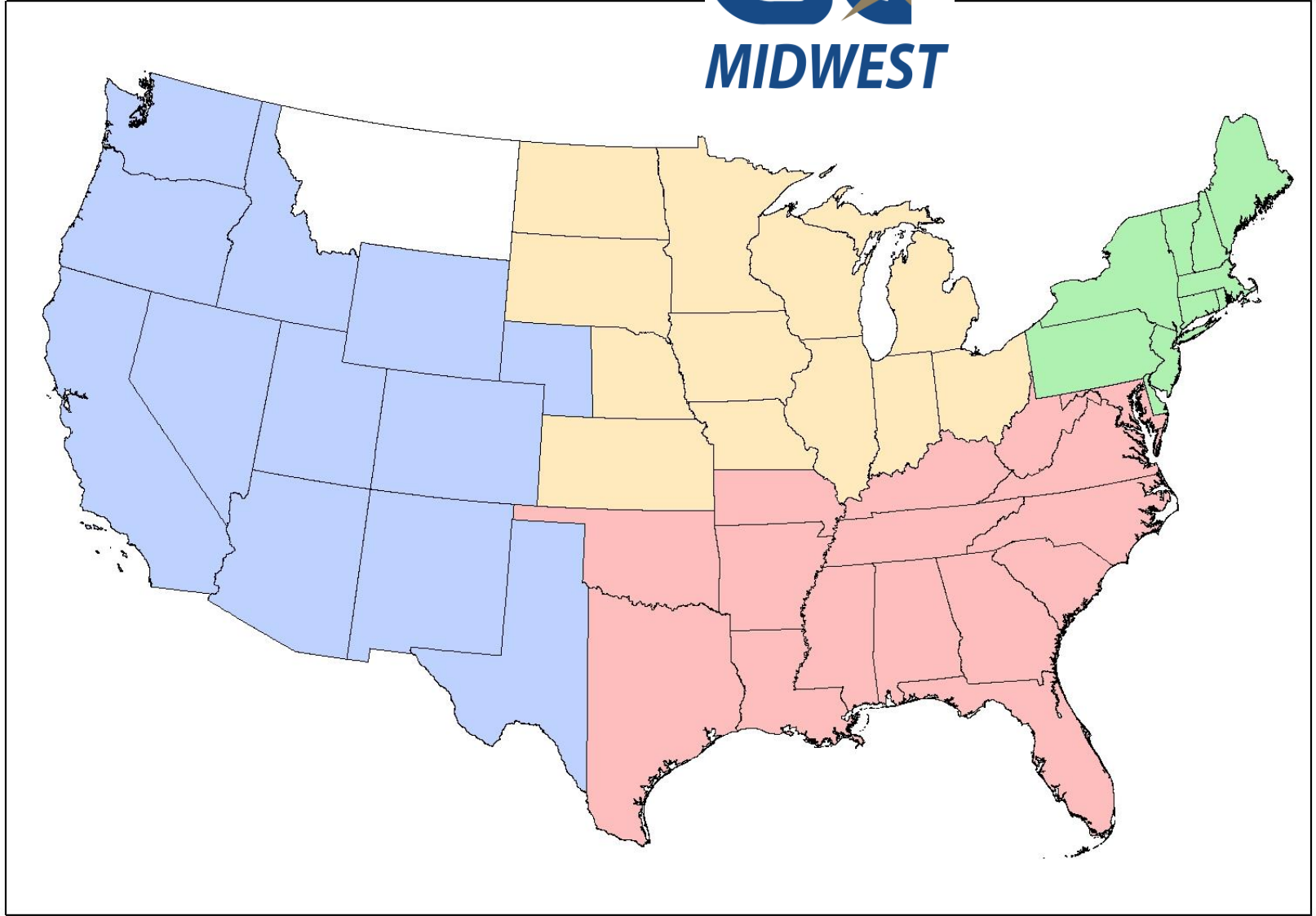












POP

QUIZ

1) In what year did NRC rules go into effect that required advance notification to states of spent fuel shipments?

- a) 1966
- b) 1974
- c) 1982
- d) 1993

Safeguards Information

Shipment Schedule

NRC Approved Truck Route # 237

Timeline:

Depart Origin: Wednesday Jur

Arrive OR/ID Line: Thursday

2) What year saw the largest number of spent fuel shipments in the United States?

- a) 1966
- b) 1974
- c) 1982
- d) 1993



3) Shippers of radioactive materials must pre-notify each state prior to each shipment.

- a) true
- b) false



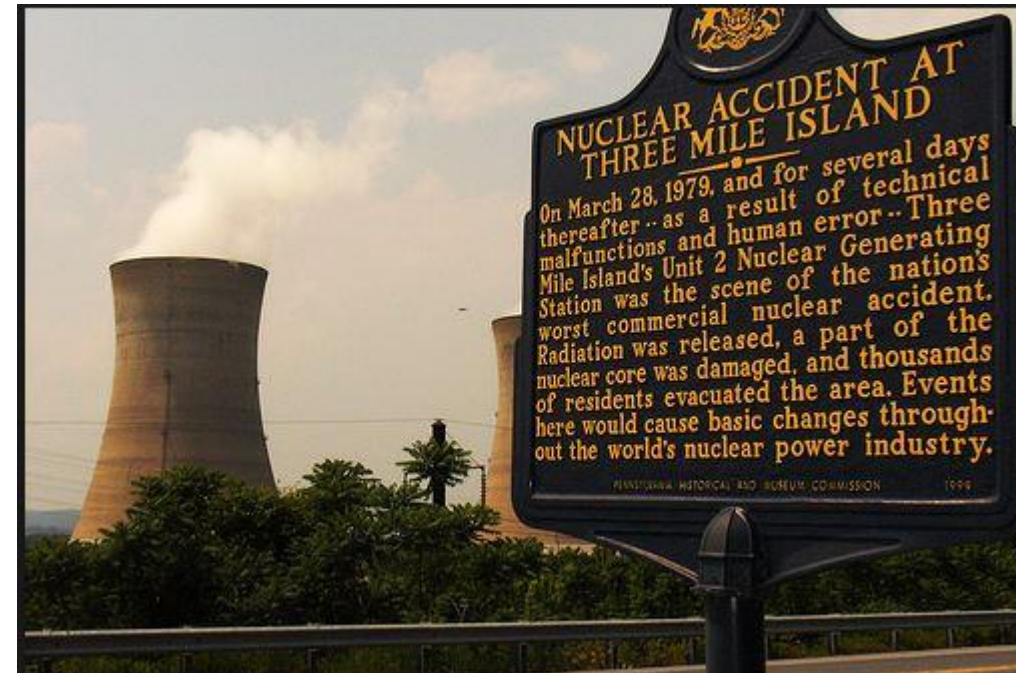
4) DOE first declared the WIPP site ready to open in:

- a) June 1985
- b) October 1991
- c) April 1995
- d) February 1999



5) Some of the WIPP transportation protocols were tested during the following shipments (pick two):

- a) Cesium capsule return to Hanford
- b) Damaged TMI spent fuel to INL
- c) Radioactive contaminated nitric acid from Hanford to England
- d) Shippingport spent fuel to Hanford



6) Western Governors' stressed the need for safe and _____ transportation for WIPP shipments:

- a) secure
- b) routine
- c) stealthy
- d) uneventful



7) WIPP has received this many transuranic waste shipments:

- a) 6,237
- b) 9,400
- c) 12,644
- d) 16,992



8) Hanford has made 650 shipments of transuranic waste. An additional ____ are expected:

- a) 645
- b) 6,450
- c) 16,450
- d) 64,500



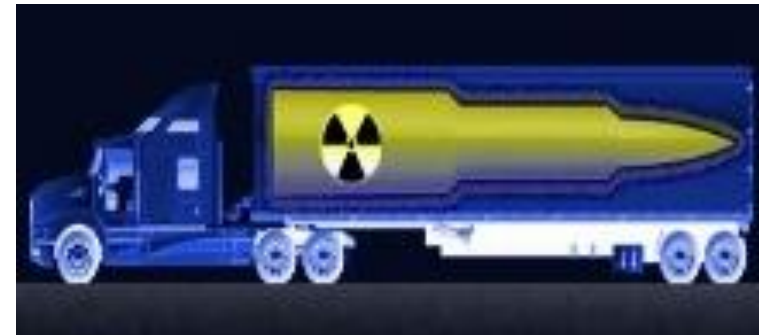
9) Loaded WIPP shipments have traveled this many miles:

- a) 940,000
- b) 2.8 million
- c) 9.7 million
- d) 15.1 million



10) Nuclear weapons need periodic maintenance and are transported through the U.S. by the federal government by:

- a) air
- b) white trains
- c) semi-truck
- d) food truck



1) In what year did NRC rules go into effect that required advance notification to states of spent fuel shipments?

- a) 1966
- b) 1974
- c) 1982
- d) 1993

Safeguards Information

Shipment Schedule

NRC Approved Truck Route # 237

Timeline:

Depart Origin: Wednesday Jur

Arrive OR/ID Line: Thursday

1) In what year did NRC rules go into effect that required advance notification to states of spent fuel shipments?

a) 1966

b) 1974

c) 1982 – Congress directed the NRC in 1980 to promulgate an advance notification rule. It went into effect July 6, 1982.

d) 1993

Safeguards Information

Shipment Schedule

NRC Approved Truck Route # 237

Timeline:

Depart Origin: Wednesday Jun

Arrive OR/ID Line: Thursday

2) What year saw the largest number of spent fuel shipments in the United States?

- a) 1966
- b) 1974
- c) 1982
- d) 1993



2) What year saw the largest number of spent fuel shipments in the United States?

a) 1966

b) 1974 – There were (at least) 223 truck shipments and one rail shipment

c) 1982

d) 1993



3) Shippers of radioactive materials must pre-notify each state prior to each shipment.

- a) true
- b) false



3) Shippers of radioactive materials must pre-notify each state prior to each shipment.

a) true

b) false - pre-notification is only required for certain high-activity shipments, such as spent nuclear fuel



4) DOE first declared the WIPP site ready to open in:

- a) June 1985
- b) October 1991
- c) April 1995
- d) February 1999



4) DOE first declared the WIPP site ready to open in:

a) June 1985

b) October 1991 – Though just four barrels of waste were ready for shipment, Energy Secretary James Watkins was determined to open WIPP as part of a five year program of experiments involving up to 9,000 barrels of waste. New Mexico's Attorney General filed suit, stopping Watkin's plan. WIPP did not receive its first shipment until March 1999.

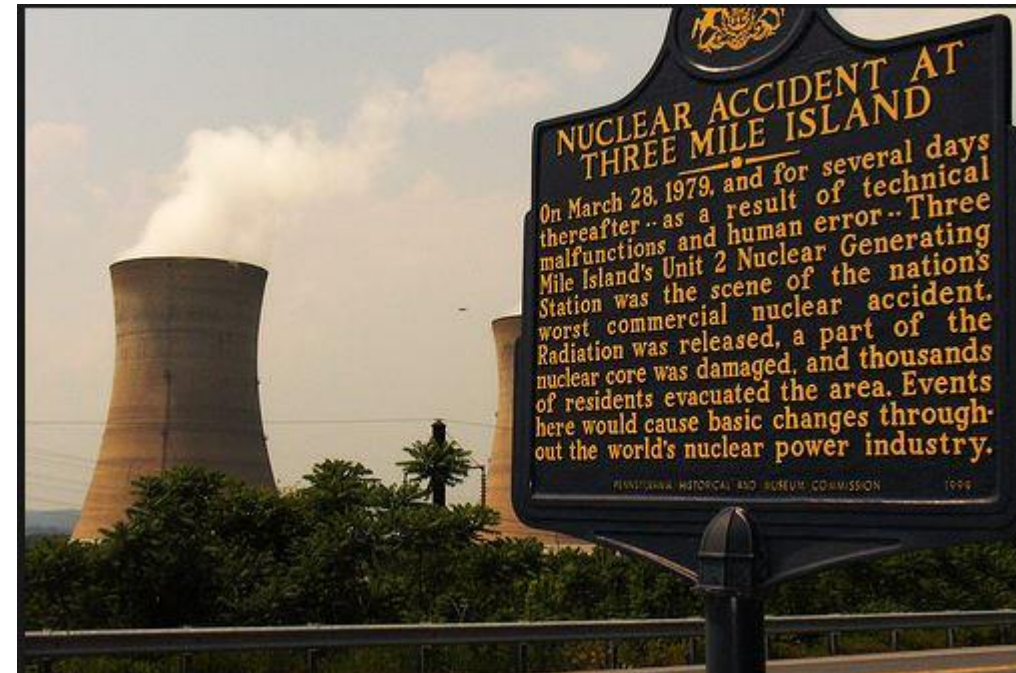
c) April 1995

d) February 1999



5) Some of the WIPP transportation protocols were tested during the following shipments (pick two):

- a) Cesium capsule return to Hanford
- b) Damaged TMI spent fuel to INL
- c) Radioactive contaminated nitric acid from Hanford to England
- d) Shippingport spent fuel to Hanford



5) Some of the WIPP transportation protocols were tested during the following shipments (pick two):

a) Cesium capsule return to Hanford Twenty cesium shipments from Colorado in 1994-95 and two additional from Virginia in 1996 provided an opportunity to test some of the WIPP protocols.

b) Damaged TMI spent fuel to INL

c) Radioactive contaminated nitric acid from Hanford to England Fifty shipments of nitric acid/LSA went in 1995 from Hanford by truck to the East Coast, for eventual shipment to England.

d) Shippingport spent fuel to Hanford



6) Western Governors' stressed the need for safe and _____ transportation for WIPP shipments:

- a) secure
- b) routine
- c) stealthy
- d) uneventful



6) Western Governors' stressed the need for safe and _____ transportation for WIPP shipments:

- a) secure
- b) routine
- c) stealthy

d) uneventful – This language was memorialized in WGA Resolution 88-001, and was the direction to state staff for working with DOE to prepare for shipments to WIPP.



7) WIPP has received this many transuranic waste shipments:

- a) 6,237
- b) 9,400
- c) 12,644
- d) 16,992



7) WIPP has received this many transuranic waste shipments:

a) 6,237

b) 9,400

c) 12,644 – During the Recovery Act, WIPP received as many as 35 shipments per week.

d) 16,992



8) Hanford has made 650 shipments of transuranic waste. An additional ____ are expected:

- a) 645
- b) 6,450
- c) 16,450
- d) 64,500



8) Hanford has made 650 shipments of transuranic wastes. An additional __ are expected:

a) 645

b) 6,450 This number could significantly change.
Shipments aren't scheduled to begin until about 2028.

c) 16,450

d) 64,500



9) Loaded WIPP shipments have traveled this many miles:

- a) 940,000
- b) 2.8 million
- c) 9.7 million
- d) 15.1 million



9) Loaded WIPP shipments have traveled this many miles:

a) 940,000

b) 2.8 million

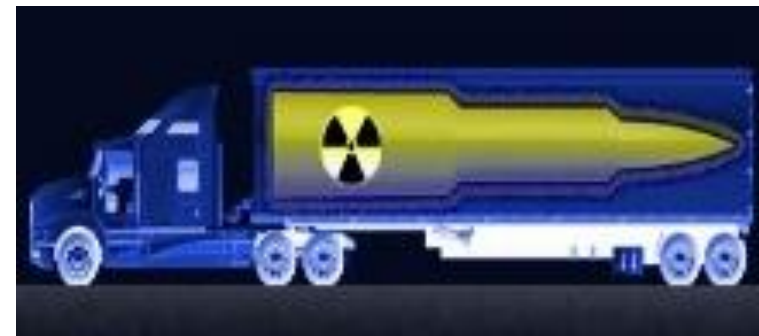
c) 9.7 million

d) 15.1 million – More than 8.9 million miles have been logged just from INL shipments.



10) Nuclear weapons need periodic maintenance and are transported through the U.S. by the federal government by:

- a) air
- b) white trains
- c) semi-truck
- d) food truck



10) Nuclear weapons need periodic maintenance and are transported through the U.S. by the federal government by:

a) air

b) white trains

c) semi-truck – The weapons are transported in unmarked semi-trucks, with numerous unmarked escort vehicles.

d) food truck



**NUCLEAR REGULATORY
COMMISSION**

10 CFR Part 71

**Advance Notification to States of
Transportation of Certain Types of
Nuclear Waste**

AGENCY: Nuclear Regulatory
Commission.

ACTION: Final rule.

SUMMARY: The Commission is amending its regulations to implement a federal statute which requires the NRC to promulgate regulations providing for timely notification to the governor of any state prior to transport of certain types of nuclear waste, including spent fuel, to, through, or across the boundary of that state. This notification provides the governor advance information, not otherwise available to the governor,

How many commercial spent fuel reprocessing plants were constructed in the United States?

- a) 1
- b) 2
- c) 3
- d) 4

BONUS



How many commercial spent fuel reprocessing plants were constructed in the United States?

3

- Nuclear Fuel Services, West Valley, NY
- G.E. Nuclear Energy, Morris, IL
- Allied General Nuclear Services, Barnwell, SC

West Valley & GE Morris accepted fuel.

Only West Valley operated.



Major Spent Fuel Shipping Activity in the U.S.

- Mid-1960s – shipments to West Valley reprocessing plant
- 1973-75 – additional shipments to West Valley
- Mid-1970s – shipments to the GE Morris facility in Illinois
- 1983 to 1989 – decommissioning of West Valley and return of fuel from GE Morris









DOE coordinated with the 10 route states

- Initial discussions began only about 4 months prior to the start of shipments
- DOE was surprised by the state requests





TMI core debris shipments



- DOE provided emergency responder training
- All shipments inspected before, during and after
- Entire rail route inspected by FRA





Western Governors' directive:



Western Governors' directive:

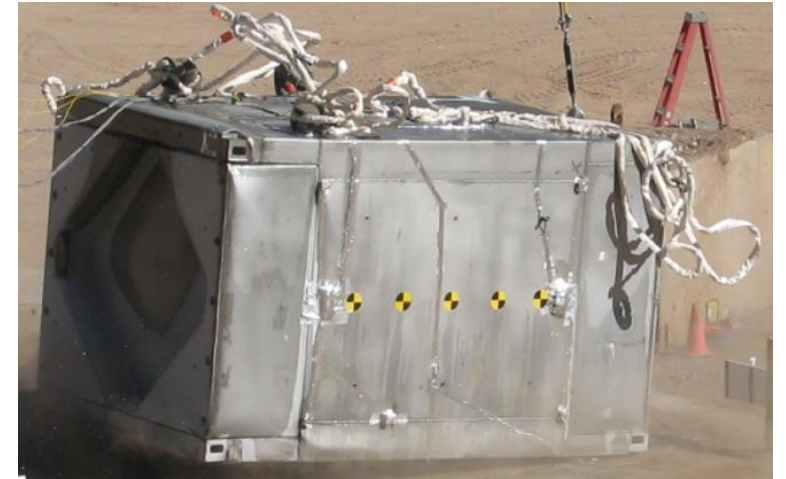
“safe and uneventful”





Many experts believe: The robustness of the shipping cask ensures safety!

Type B cask testing







The WIPP transportation program includes many extra-regulatory requirements

A common sense approach to safety

You can reduce the
likelihood of an
accident!



Common sense tells you...

This is not the guy
you want driving a
WIPP truck.



Common sense tells you...

You want to maintain
your WIPP trucks
better than this.



Common sense tells you...

You don't want your WIPP trucks on the road in this weather.



Common sense tells you...

This is not the route
you would choose for
a WIPP shipment.



Common sense tells you...

This is not where you
would safe park a
WIPP shipment.



Common sense tells you...

You want your first responders more capable than this guy.



Accident Prevention



Accident Prevention

- **High quality trucking companies**



Accident Prevention

- **High quality trucking companies**
- **Well trained, experienced drivers**



Accident Prevention

- **High quality trucking companies**
- **Well trained, experienced drivers**
- **Rigorous inspections**



Accident Prevention

- **High quality trucking companies**
- **Well trained, experienced drivers**
- **Rigorous inspections**
- **Bad weather protocols**



Accident Prevention

- **High quality trucking companies**
- **Well trained, experienced drivers**
- **Rigorous inspections**
- **Bad weather protocols**
- **Safe parking protocols**



Accident Prevention

- **High quality trucking companies**
- **Well trained, experienced drivers**
- **Rigorous inspections**
- **Bad weather protocols**
- **Safe parking protocols**
- **Use the best routes**



Emergency Preparedness



Emergency Preparedness

- **Trained and equipped emergency responders and emergency medical personnel**



Emergency Preparedness

- **Trained and equipped emergency responders and emergency medical personnel**
- **Realistic training exercises**



Emergency Preparedness

- **Trained and equipped emergency responders and emergency medical personnel**
- **Realistic training exercises**
- **Shipment tracking**



Emergency Preparedness

- **Trained and equipped emergency responders and emergency medical personnel**
- **Realistic training exercises**
- **Shipment tracking**
- **Advance notification**



Emergency Preparedness

- **Trained and equipped emergency responders and emergency medical personnel**
- **Realistic training exercises**
- **Shipment tracking**
- **Advance notification**
- **Updated plans and procedures**



WIPP protocols used on cesium shipments





KMGH newscast

May 18, 1994



KMGH newscast

“A half dozen Western states don’t like it, but a truckload of deadly radioactive waste is about to speed down the interstate from Denver to a nuclear graveyard in Washington.

The deadly material is on the road because of what amounts to a recall by the Department of Energy.

Dave Minchell joins us live in Northglenn where a huge cask of deadly cesium is about to hit the road. It’s frightening just thinking about it Dave.”

KMGH newscast

“A half dozen Western states don’t like it, but a truckload of **deadly radioactive waste** is about to **speed down the interstate** from Denver to a **nuclear graveyard** in Washington.

The **deadly material** is on the road because of what amounts to a **recall** by the Department of Energy.

Dave Minchell joins us live in Northglenn where a **huge cask of deadly cesium** is about to hit the road. It’s **frightening** just thinking about it Dave.”

Nuclear Transport Armageddon Bingo

B	I	N	G	O
deadly radioactive waste	danger	fallout	lethal cargo	mushroom cloud
radioactive spider bite	nuclear graveyard	cancer	doomsday	deadly material
nuclear release	mobile Chernobyl	FREE	contamination	meltdown
deadly	dangerous	atomic	frightening	Fukushima freeway
deadliest substance known to man	scary	mutate	toxic	speed down the interstate

Nuclear Transport Armageddon Bingo

B	I	N	G	O
radioactive waste	danger	fallout	lethal cargo	mushroom cloud
radioactive spider bite	nuclear glow-in-the-dark	cancer	doomsday	deadly material
nuclear release	mobile Chernobyl	FREE	contamination	meltdown
radioactive	dangerous	atomic	fallout	Fukushima freeway
deadliest substance known to man	scary	mutate	toxic	speed limit on the interstate

Nuclear Transport Armageddon Bingo

B	I	N	G	O
radioactive waste	danger	fallout	lethal cargo	mushroom cloud
radioactive spider bite	nuclear glow	cancer	doomsday	deadly material
nuclear release	mobile Chernobyl	FREE	contamination	meltdown
radioactive	dangerous	atomic	falling	Fukushima freeway
deadliest substance known to man	scary	mutate	toxic	speed limit on the interstate

WIPP shipments



WIPP shipments

- **12,644 shipments**



WIPP shipments

- **12,644 shipments**
- **15.1 million miles**



WIPP shipments

- 12,644 shipments
- 15.1 million miles
- **only a handful of minor accidents**





July 2017



July 2013

December 2007



June 2005



2019-06-04T19:27:27Z C43





December 2005











August 2004











Critics: the WIPP transportation program includes unneeded costs & requirements



What really is necessary for an acceptable spent nuclear fuel transport program?





Transportation planning ongoing, but DOE reluctant to make firm commitments

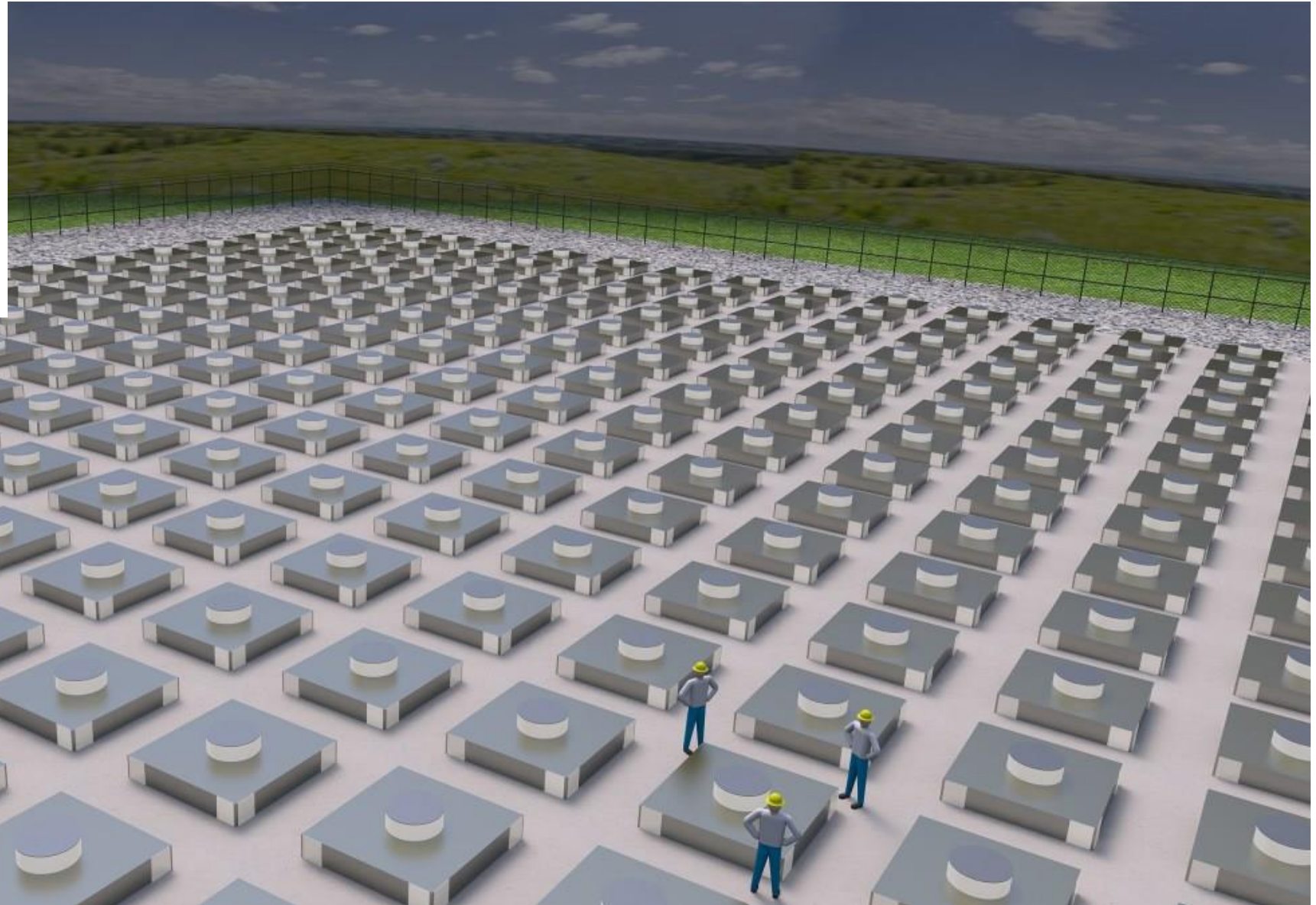
DOE moving forward with some infrastructure pieces – such as development of a new railcar that meets railroad industry standards



The Eddy-Lea Energy Alliance



Community-Backed Solutions to National Problems

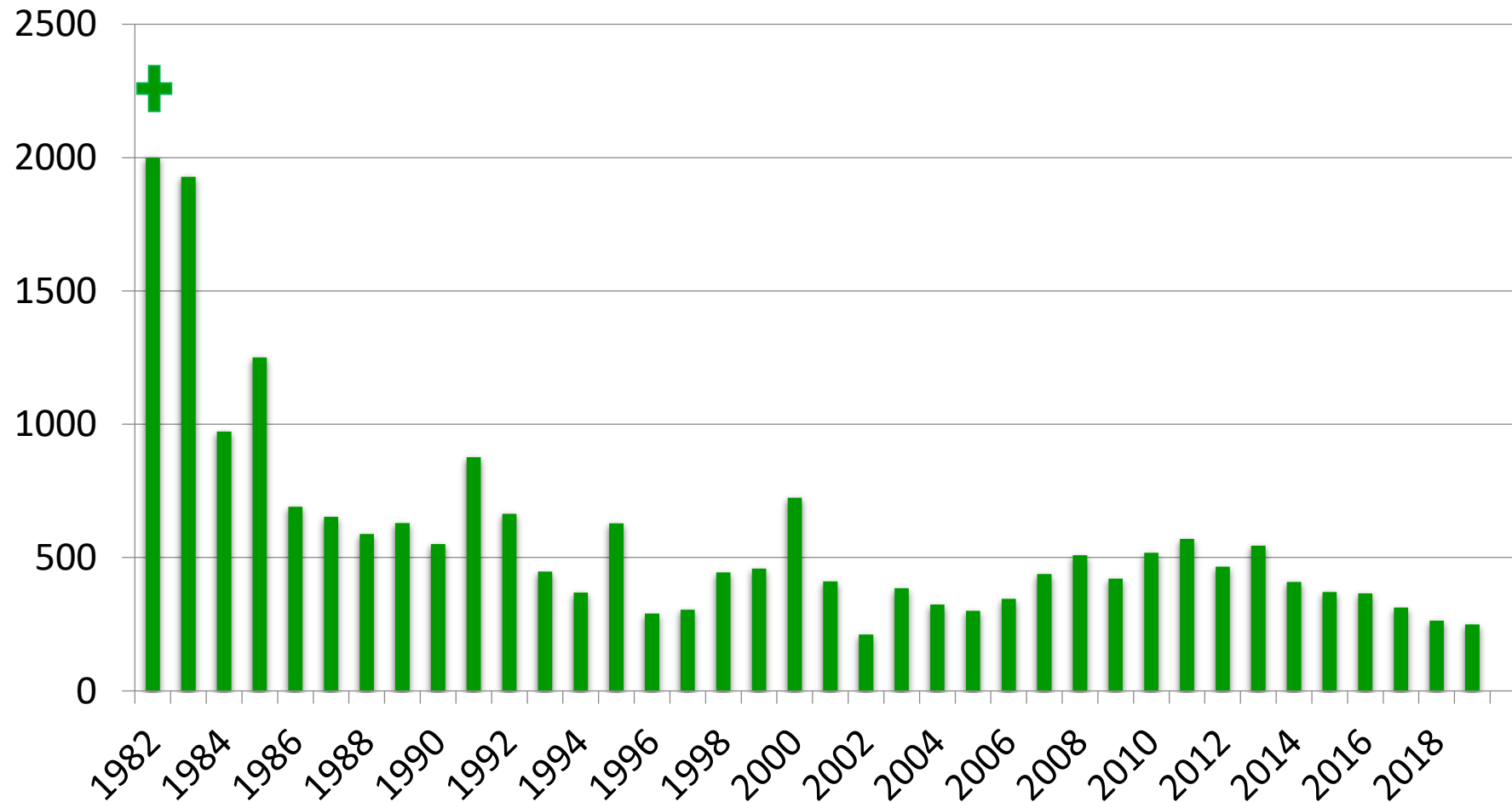






Number of shipments

1982-2019



Much of radioactive material transport in Oregon used to be related to Hanford



Hanford-related shipments

For decades, Hanford was a recipient of LLW and MLLW from National Labs and other DOE facilities around the nation



NILES Ken

From: John_E_Maxwell@RL.gov
To: Dennis_W_Claussen@apimc01.rl.g; James_H_Jim_Portsmouth@apimc01;
John_E_Maxwell@apimc01.rl.gov; NILES Ken
Subject: Shipment Notification
Date: Friday, August 14, 1998 4:29PM

The following shipments will be arriving at Hanford on:

August 17th -- Three LSA waste trucks from General Atomics in Calif.

Four LSA Waste from Rocketdyne in Calif.

August 18th -- One shipment of LSA waste from NewJersey.

August 20th -- Four roll-off boxes of waste from Rocketdyne

One shipment from Fermi labs in Illinois.

NILES Ken

From: John_E_Maxwell@RL.gov
To: Dennis_W_Claussen@apimc01.rl.g; James_H_Jim_Portsmouth@apimc01;
John_E_Maxwell@apimc01.rl.gov; NILES Ken
Subject: Shipment Notification
Date: Thursday, September 17, 1998 9:31AM

Hanford will be receiving one truckload of LSA waste from Knolls Atomic Power Lab on Monday, Sep. 21st.

We will also be receiving 7 truckloads of LSA placarded waste from Brookhaven Labs in New York on Thursday, Sept 24th.

NILES Ken

From: John_E_Maxwell@RL.gov
To: Dennis_W_Claussen@apimc01.rl.g; James_H_Jim_Portsmouth@apimc01;
John_E_Maxwell@apimc01.rl.gov; NILES Ken
Subject: Shipment Notifications
Date: Friday, September 25, 1998 1:00PM

The following shipments of RAM LSA waste will be arriving next week, Sept. 28-30, and Oct. 1-2.

1. 3 truckloads on Monday, Sep. 28th from Brookhaven Nat Labs in N.Y.
2. 1 truckload from Paducah, Ky. on Sep. 28th.
3. 4 truckloads from Brookhaven on Tuesday, Sep. 29th.
4. 1 truckload from Paducah on Wednesday, Sep. 30th.
5. Possibly 2 truckloads from Paducah on Friday, Oct. 2nd. or the following Monday.



Shipments to Hanford

Most waste shipments to Hanford stopped in 2004

DOE's decision in 2000 to name Hanford as one of two sites nationally to take potentially tens of thousands of truck loads of waste helped prompt an initiative and litigation that prevented that decision from being implemented



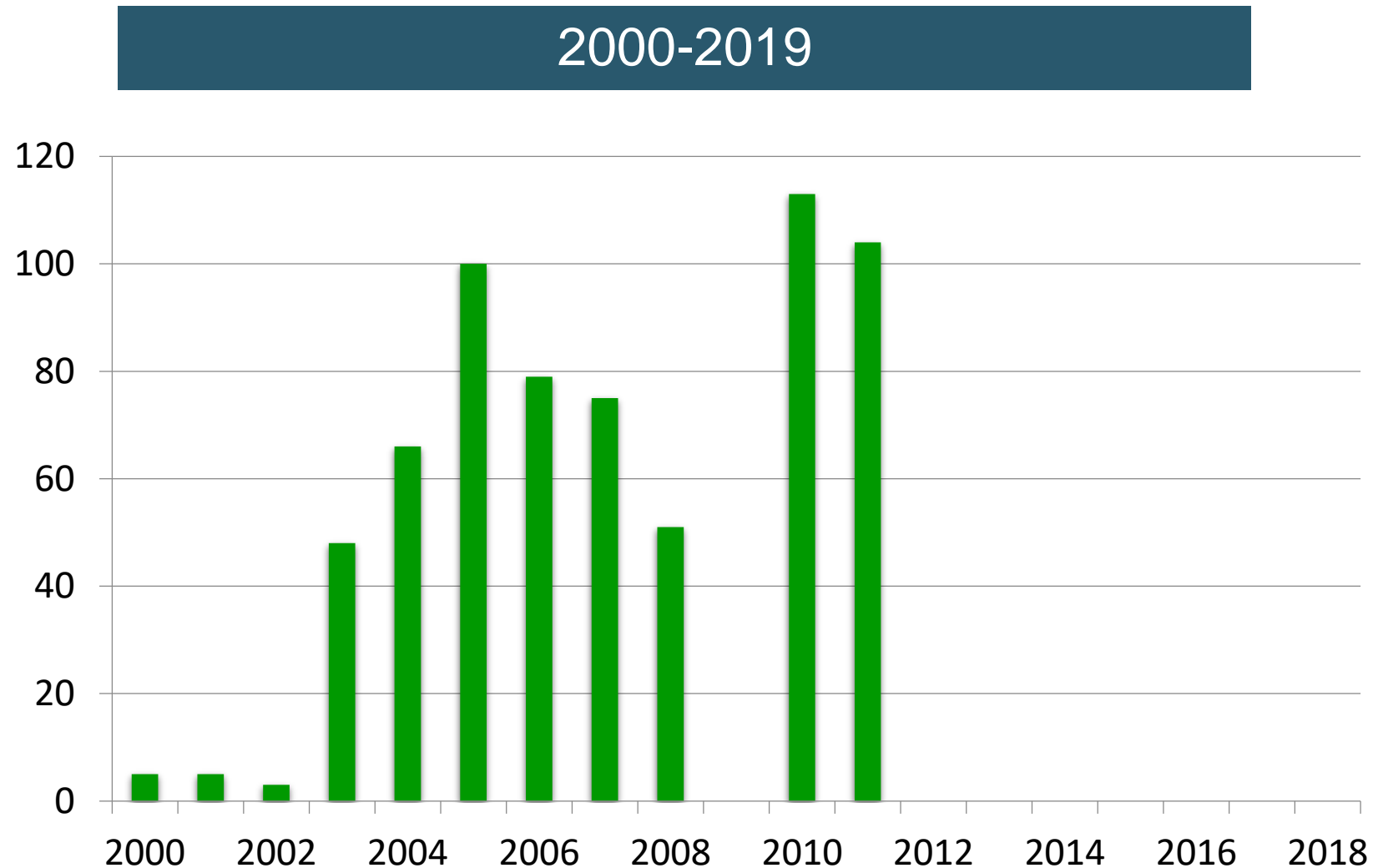
WASHINGTON STATE TO FILE LAWSUIT AGAINST DEPARTMENT OF ENERGY TO HALT WASTE SHIPMENTS TO HANFORD

FOR IMMEDIATE RELEASE:

Jul 16 2004

OLYMPIA -- Gov. Gary Locke and Attorney General Christine Gregoire today announced that Washington state intends to sue the federal Department of Energy (DOE) to halt further...

Transuranic waste shipments from Hanford



Transuranic waste shipments from Hanford

Estimate for resumption of shipments: 2026-2028

- Up to 6,450 additional shipments expected from Hanford
- Future shipments will involve higher levels of radioactivity



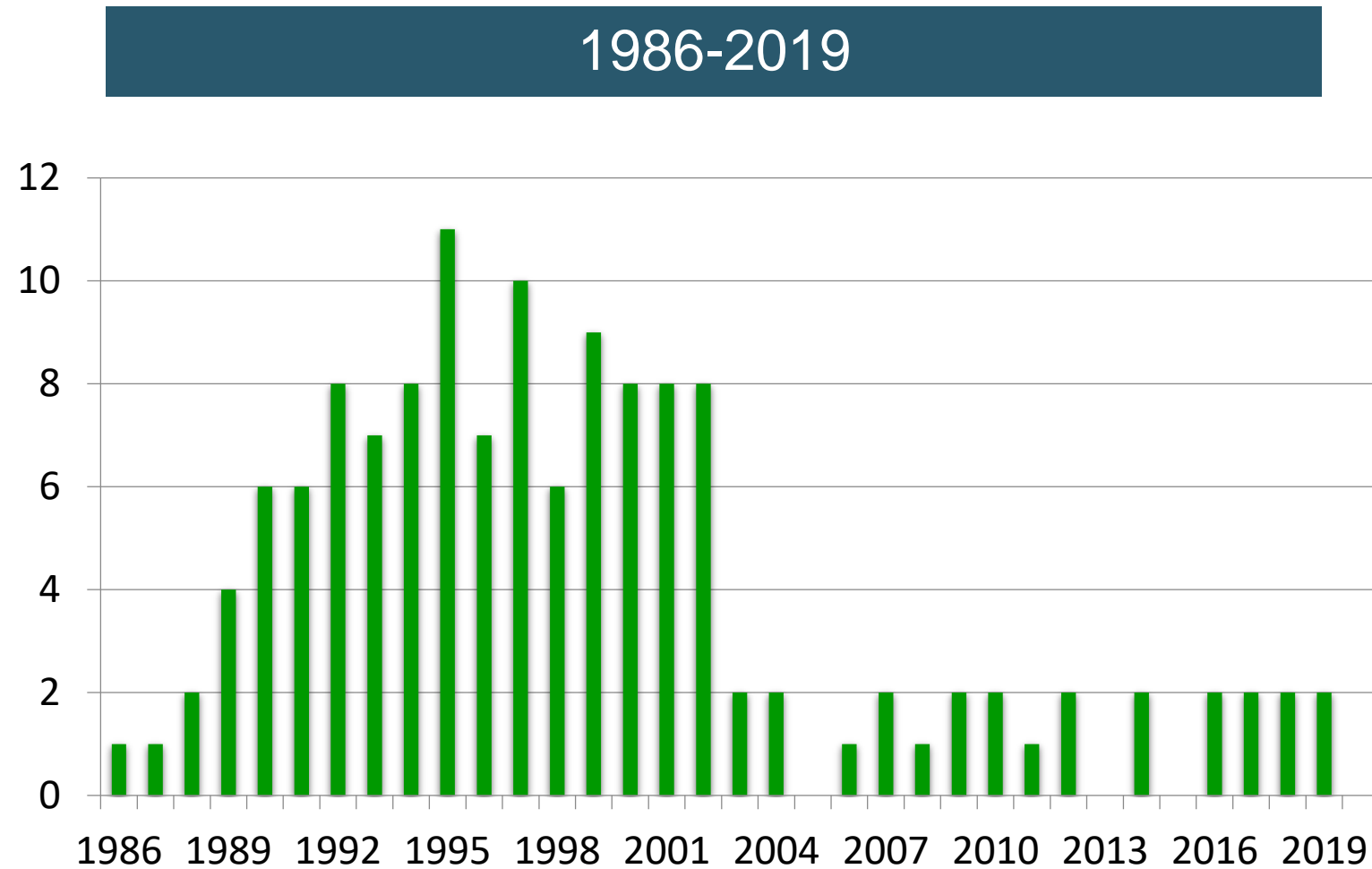
Navy reactor compartment shipments

Shipments by barge

- Shipped up the Columbia River for disposal at Hanford
- Qualify as low-level waste
- 135 so far



Navy reactor compartment shipments



Low-Level Waste Shipments

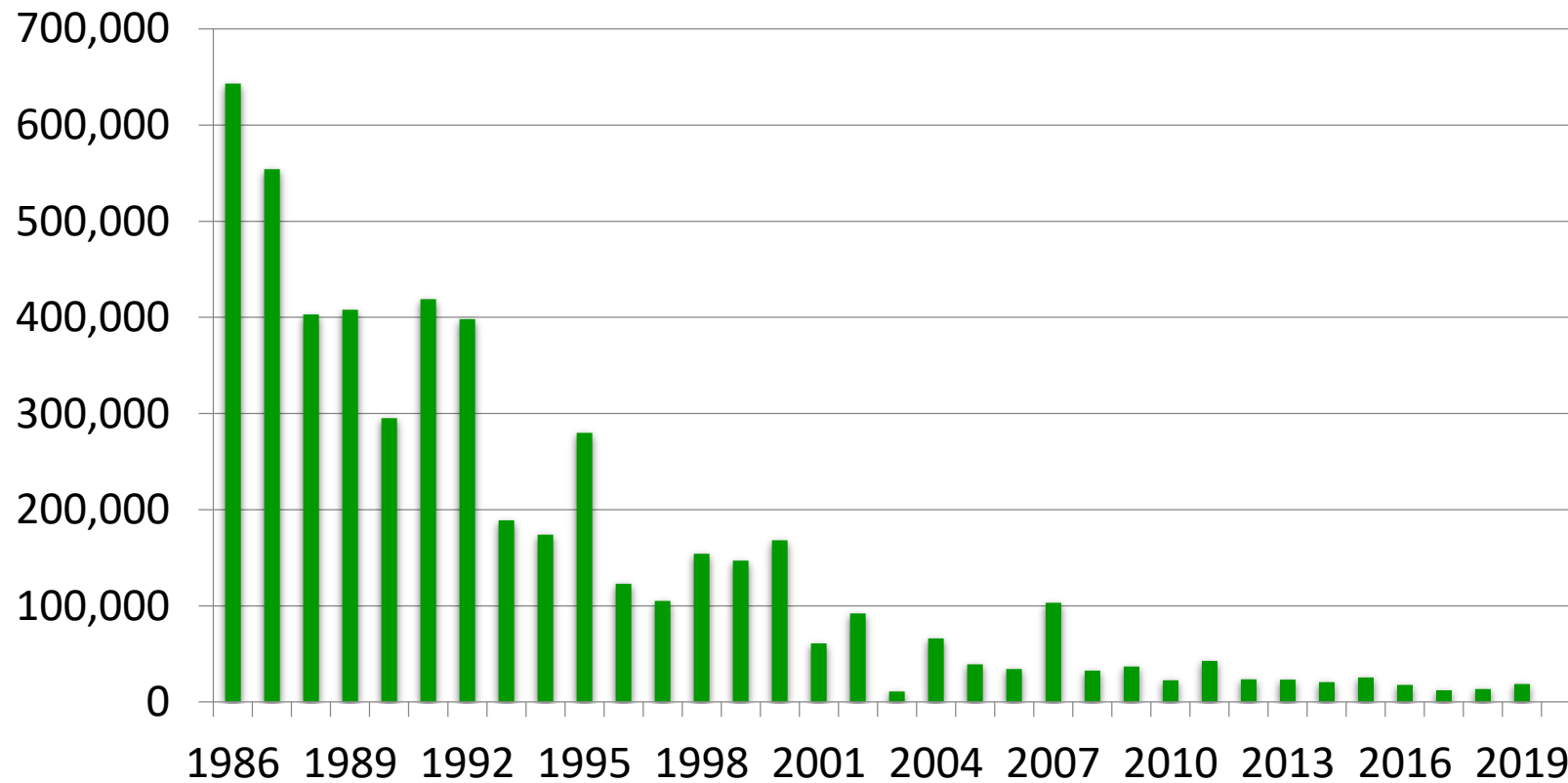
Commercial low-level waste

- Commercial LLW waste accepted from 11 Western and Rocky Mountain states
- Shipment numbers relatively few since 2003



Low-level waste disposal volume

In cubic feet





Shipments through Oregon/WA

FRAMATOME

- Converts uranium hexafluoride (UF₆) to new reactor fuel
- UF₆ both corrosive and radioactive



Shipments through Oregon/WA

FRAMATOME

- UF6 inbound
- New fuel outbound



Shipments through Oregon/WA

Perma-Fix Northwest

- Accepts low-level waste from throughout the nation for treatment
- Treated waste is then sent to a disposal site or returned to its origin



Navy spent fuel shipments

Shipments by rail

- Armed federal agents accompany all loaded shipments
- Escorts ride in a modified caboose



Nuclear weapons transportation

Naval Base Kitsap-Bangor



Nuclear weapons transportation

Strategic Weapons Facility Pacific

Submarine launched ballistic missiles are stored and maintained at the Strategic Weapons Facility Pacific



Nuclear weapons transportation

Shipments by truck

Schedules: Classified

Frequency: Classified



Nuclear weapons transportation

- Armed federal agents accompany the shipments
- Armored, unmarked tractor-trailer rigs and escort vehicles with U.S. Government license plates
- In constant radio communication with control center
- During an accident, federal agents will control the scene
- Local responders may not be asked for assistance

**National Nuclear Security
Administration: Office of
Secure Transportation**

What are your questions?

